

SIZE DISTRIBUTIONS OF AIR SHOWERS ACCOMPANIED WITH HIGH  
ENERGY GAMMA RAY BUNDLES OBSERVED AT MT. CHACALTAYA

Matano, T. and Machida, M.

Department of Physics, Saitama University,  
338 Urawa, Japan

Tsushima, I., Kawasumi, N., Honda, K. and Hashimoto, K.

Department of Physics, Yamanashi University,  
400 Kofu, Japan

Martinic, N., Zapata, J., Navia, C., Aguirre, C., Siles, L.  
and Magnani, R.

Instituto de Investigaciones Fisicas  
Universidad Mayor de San Andres, La Paz, Bolivia

ABSTRACT

We report size distributions of air showers accompanied with bundle of high energy gamma rays and/or large size bursts under emulsion chambers, in order to study the composition of primary cosmic rays and also characteristics of high energy nuclear interaction.

Air showers initiated by particles with a large cross section of interaction may develop from narrow region of the atmosphere near the top. Consequently, fluctuations of sizes of air showers are not so large.

On the contrary, starting levels of air showers by particles with smaller cross section fluctuate in wider region of the atmosphere. Air showers of extremely small size accompanied with bundle of gamma rays may be ones initiated by protons at lower level after penetrating deep atmosphere without interaction. In such cases, the air shower size distribution may be flatter than previous case.

We have determined the relative size distribution according to the total energy of bundle of gamma rays and the total burst size observed under 15 cm lead absorber. These results are discussed on the point of view mentioned above.